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High quality epitaxial layers of piezoelectric monocrystalline materials can be grown overlying monocrystalline substrates such as large silicon wafers by forming a compliant substrate for growing the piezoelectric monocrystalline layers. An accommodating buffer layer comprises a layer of monocrystalline oxide spaced apart from a silicon wafer by an amorphous interface layer of silicon oxide. The amorphous interface layer permits the growth of a high quality monocrystalline oxide accommodating buffer layer. The accommodating buffer layer is lattice matched to both the underlying silicon wafer and the overlying piezoelectric monocrystalline material layer.